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obtained July 2d and 3d. Young larvæ appeared July 9th, and were supplied with ash leaves and grass, but soon died.

In the hope of finding half-grown larvæ, the grove was visited October 21st, and three larvæ were found, after considerable search, feeding on the few dead leaves still hanging to some sprouts from the base of a few trees. A misty rain falling at the time, moistened the leaves so that they could be eaten by the caterpillars with little difficulty and apparent relish. The larvæ were 10-12 mm. long when extended in motion, and had the form and characteristic markings of full-grown specimens, except in being somewhat lighter colored, and having the subdorsal and terminal lateral stripes grayish white—not tinged with orange.

It is probable from the above, that this insect is single-brooded—wintering in the larval stage; and that the ash is its ordinary food plant. The fact that the weeds, *Eupatorium* sp. and *Solidago* sp., common in the grove, and the various perennial grasses thereabouts, were still more or less green, and yet untouched by them, is further evidence that the ash is the food plant of the young as well as the adult larva.

Egg: .75 mm. in diameter, nearly spherical, slightly flattened at base. To the unaided eye the surface appears smooth and shining, but with careful focusing with high power it is seen to be covered with raised lines forming a regular hexagon. Color, amber yellow, faintly mottled with a lighter shade.

Young larva: Length, about 2 mm.; head broader than body, resinous, armed with a few hairs; eye spots, black; piliferous tubercles, thoracic shield, anal plate and plates on abdominal feet, resinous; hairs, one to each tubercle, light colored, equaling the thickness of the body in length; tubercles on each of the thoracic segments 10, arranged in one transverse row, on abdominal segments except last, in two rows, 6 in anterior, and 4 in posterior row.

Mature larva: Length, 25-28 mm.; head somewhat less in diameter than the first thoracic segment, slightly bilobed, shining black, armed with a considerable number of black hairs; body, uniformly cylindrical, black, marked along the center of the dorsum by an orange stripe lighter colored between segments; a similar stripe, interrupted with black, covers the area just above and partly including the stigmata; a narrow, whitish-yellow line occurs midway of the dorsal and stigmatal orange stripe; and a similar line, curving down on the segments, borders the lower edge of the sides; area below the bordering lateral stripe, including the thoracic, and all but the inner surface of the abdominal feet, black, marked on each of the abdominal segments with an oblique yellowish spot; ventral surface within thoracic and abdominal feet, ashy, finely dotted with dark; segments armed with transverse rows of shining blue-black tubercles, which are covered with short, radiating hairs, both black and white, the black predominating on the dorsal, and the white on the lateral tubercles; stigmata, black.

Pupa: 15x5.5 mm.; dark reddish brown, robust, considerably enlarged back of the thoracic segments; last segment terminating in a produced semi-circular edge, slightly notched at the center, and armed with short, more or less forked hairs; wing-cases extend nearly to the posterior margin of the fourth segment; stigmata elongate, slightly elevated; general surface shining, abdominal segments minutely and sparsely punctured.

OBSERVATIONS ON THE DIVINING-ROD.

BY EDWARD A. KILIAN, ALMA.

To the unprejudiced, without doubt it must be a fact that "water-witching," as it is popularly called, is either a self-deception or an intentional fraud by those

claiming to have the power to divine underground water near the surface by means of a forked stick. That all who pretend to have this power of divination are intentional deceivers, I have always doubted. Ever before seeing "water-witching" performed, I had been of the opinion that there must be, as Prof. Czermak calls it in his lectures on *hypnotism*, "a not well or not clearly-observed fact." In vain I sought for an explanation of the phenomenon. Works treating on the solution of popular superstitions did not give the least explanation. Mayo, in "Truth in Popular Superstitions, Divining-Rod and Witchcraft," comes to no solution of the problem; he experiments with the rod, but does not find the real cause. An article in a number of the St. Louis *Globe-Democrat* in March, 1888, on "Divination," does not solve it, in spite of all endeavors to do so.

Whether anyone else has made the observations herein stated, I do not know. They were made by a friend of mine, Werner A. Stille, Ph. D., Principal of the Baden Schools, Baden, St. Louis, Mo.; and myself.

I saw "water-witching" performed for the first time some ten years ago, by an old honest farmer, who believed in it as gospel truth. Walking by the side of the performer, it became at once clear to me that there was a case of self-deception.

It may be hardly necessary to give a description of the divining rod. The forked hazel or the forked twig of a peach tree are in high esteem by those who practice "water-witching," although any other forked twig will do. Both prongs of the rod have to be thin, of nearly equal thickness, and about two feet in length. An end is taken in each hand, the arms extended forward, and held stiff; the hands are kept at about the height of the hips, and turned outward, so that the closed fingers are above and the thumbs at the outside of the hands; the rod is grasped tightly and held horizontally, while walking over the ground to be explored for water.

Both arms and hands thus in a strained position are to regain a more easy position, but the rod must be held tightly. As the turning of the arms and hands is either by relaxation of the muscles or involuntarily, an invisible power seems to be active in twisting the rod out of the operator's hands. In the endeavor of the muscles to regain their natural position, the hands turn somewhat, and by observing them closely it will be seen that by this involuntary movement of the hands, caused by the relaxation of the muscles, the rod is bent downward, and in some instances with so great a force that it is twisted in the hand, and one or the other end will break.

And surely water will be found if "water-witching" is exercised in places where underground water near the surface is in abundance.

Try the experiment, which is easy to perform, and you have a very fine illustration of a "not well or not clearly observed fact."

METEOROLOGICAL SUMMARY FOR THE YEARS 1887 AND 1888.

PREPARED BY PROF. F. H. SNOW, UNIVERSITY OF KANSAS, FROM OBSERVATIONS TAKEN AT LAWRENCE.

1887.

The year 1887 was marked by a cold winter and a warm spring, while the summer and autumn were of nearly the average temperatures. The total rainfall fell but little short of the average amount, but its distribution was unfavorable to corn and other midsummer crops. A serious deficiency in July found the ground nearly destitute of moisture, on account of the eleven-inch deficiency of the year 1886, and in less than two weeks what promised to be the most abundant corn crop ever produced